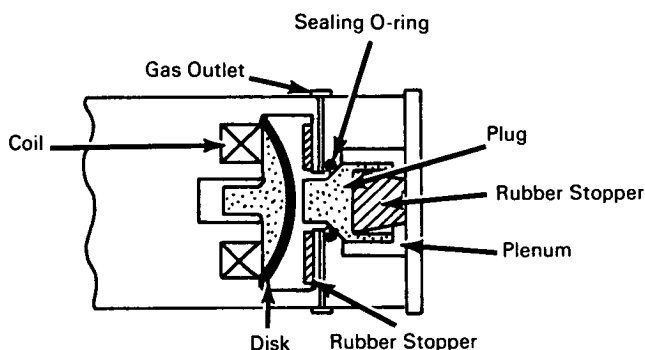


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NASA TECH BRIEF

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Eddy Current Disk Valve

A quick-opening, intermittent flow valve which requires a small amount of electrical energy to open and which closes by the restoring action of a rubber stop has been developed. The valve opens in less than 100 microseconds, takes only 10 joules of energy, and has survived 50,000 operations without damage. The basic losses are ohmic heating in the coil and in the disk. The design should be applicable to many quick-opening, intermittent flow requirements in fluid systems. By varying the strength of the electrical coil and the restoring force of the rubber stopper, this design can also be adapted to maintain the valve in an open position as long as energy is applied to the coil.

This valve is operated by discharging an energy storage capacitor into the coil. Eddy currents induced in the disk cause it to be accelerated into the plug. The plug is driven off the sealing O-rings and compresses the rubber stopper. This permits gas to flow from the plenum chamber to the gas outlets. The com-

pressed rubber stopper restores itself and the plug to their original positions, shutting off the gas flow.

In this design, the disk is allowed to accelerate to its terminal velocity before impacting the sealing plug. This is in contrast to similar valves in which the disk itself opens a seal during its initial movement. The described arrangement allows a longer time for the magnetic forces to act and, thus, a relatively higher impedance for the force coil which can be matched to the energy storage capacitor.

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135
Reference: B67-10638

(continued overleaf)

or to:

New Technology Representative
General Dynamics/Convair Division
Mail Zone 103-19
5001 Kearny Villa Road
San Diego, California 92112
Reference: B67-10638

Patent status:

No patent action is contemplated by NASA.

Source: A. V. Larson, L. Liebing,
and R. Dethlefsen
of General Dynamics/Convair Division
under contract to
Lewis Research Center
(LEW-10123)